

Claims

What is claimed is:

1 1. Apparatus for implementing very high density signal probing of
2 a printed circuit board having a pad pattern connected to signals of interest,
3 said apparatus comprising:

4 a metal plate including a plurality of through holes arranged in a
5 predefined pattern; said predefined pattern corresponding to the pad pattern
6 on the printed circuit board;

7 at least one signal module; each said signal module being inserted
8 within a selected one of said through holes; each said signal module defining
9 a coaxial connector for electrical mating engagement with a coaxial cable
10 connector and having an embedded resistor; and

11 at least one power/ground module; each said power/ground module
12 inserted within a selected one of said through holes; each said power/ground
13 module containing a high dielectric constant material between an outer
14 conductor and a center conductor defining a capacitor; said capacitor
15 providing a low impedance path between said metal plate and a power or
16 ground pad of the printed circuit board.

1 2. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 1 includes a pad-on-pad connector
3 connected between each said signal module and each said power/ground
4 module and corresponding pads on the printed circuit board.

1 3. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 1 wherein each said signal module
3 includes an outer conductor made of an electrically conductive material
4 arranged for mounting said signal module to a mating coaxial cable
5 connector.

1 4. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 3 wherein each said signal module
3 further includes a base conductor and a central conductor contained within
4 said outer conductor; said central conductor received in mating engagement
5 with a central conductor of said mating coaxial cable connector and
6 electrically insulated from said outer conductor; and said base conductor
7 electrically coupled to a signal pad on the printed circuit board.

1 5. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 4 wherein said embedded resistor
3 is located between said base conductor and said central conductor for
4 minimizing the loading on the signal to be monitored.

1 6. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 4 wherein outer conductor makes
3 electrical contact with said metal plate.

1 7. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 1 wherein said center conductor of
3 each said power/ground includes a base portion electrically coupled to said
4 power or ground pad on the printed circuit board, and an elongated
5 conductor portion supported by said base portion extending within said outer
6 conductor.

1 8. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 7 wherein said high dielectric
3 constant material extends around said base portion and said elongated
4 conductor portion within said outer conductor defining said capacitor.

1 9. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 7 wherein outer conductor makes
3 electrical contact with said metal plate.

1 10. Apparatus for implementing very high density signal probing of
2 a printed circuit board as recited in claim 1 wherein said metal plate includes
3 alignment features for alignment with cooperating features of the printed
4 circuit card.

1 11. A method for implementing very high density signal probing of
2 a printed circuit board having a pad pattern connected to signals of interest,
3 said method comprising the steps of:

4 providing a metal plate including a plurality of through holes arranged
5 in a predefined pattern; said predefined pattern corresponding to the pad
6 pattern on the printed circuit board;

7 providing a signal module defining a coaxial connector for electrical
8 mating engagement with a coaxial cable connector and having an embedded
9 resistor;

10 inserting at least one signal module within a selected one of said
11 through holes;

12 providing a power/ground module containing a high dielectric constant
13 material between an outer conductor and a center conductor defining a
14 capacitor; and

15 inserting at least one power/ground module within a selected one of
16 said through holes; said capacitor defined by each said power/ground
17 module providing a low impedance path between said metal plate and a
18 respective power/ground pad of the printed circuit board.

1 12. A method for implementing very high density signal probing of
2 a printed circuit board as recited in claim 11 includes providing said metal
3 plate with alignment features for alignment with cooperating features of the
4 printed circuit card.

1 13. A method for implementing very high density signal probing of
2 a printed circuit board as recited in claim 11 includes providing said
3 embedded resistor for minimizing the loading on the signal to be monitored.

1 14. A method for implementing very high density signal probing of
2 a printed circuit board as recited in claim 13 includes providing said
3 embedded resistor between a base conductor electrically coupled to a signal
4 pad on the printed circuit board and a central conductor electrically coupled
5 to said mating coaxial cable connector.